ROLE OF MR IMAGING IN DIAGNOSIS, STAGING AND FOLLOW UP OF PATIENTS WITH CARCINOMA CERVIX

ABSTRACT:

BACKGROUND:

Carcinoma cervix is the most common malignancy among Indian women. The current system of staging cervical carcinoma is based on International Federation of Gynaecology and Obstetrics (FIGO) Classification.

This staging system is based upon findings from examination of patient under anaesthesia supplemented by radiography, excretory urography, cystoscopy and sigmoidoscopy. CT or MRI is not initially used as a part of evaluation. However, this clinical staging is more prone for errors and hence cross sectional imaging is needed in these patients for accurate staging.

These errors in clinical examination are due to lack of recognition of infiltration of parametrium, pelvic side wall, bladder wall, rectal wall and metastatic spread. Cross sectional imaging solves these issues. The FIGO classification does not include the nodal staging, which is an important prognostic factor in patient management. Assessment of nodal status is helpful in planning of radiotherapy and in giving good clearance in early disease. Brachytherapy and external beam radiotherapy are optimized with MR imaging. Also, MRI is the best modality of choice for imaging recurrence of tumor and in prediction of treatment response.

OBJECTIVES OF THE STUDY

- To evaluate the efficacy of MRI in assessment of important prognostic factors in carcinoma cervix like tumor size, involvement of parametrium, involvement of pelvic side wall, involvement of adjacent organs and the nodal status and how it alters the plan of management .

- To study the role of MRI in detecting the recurrence of carcinoma cervix in patients treated with radiotherapy.

- To correlate MRI findings with FIGO staging of carcinoma cervix.

- To evaluate the validity of MRI in detection of treatment response and recurrence in treated patients of carcinoma cervix.

MATERIALS

From June 2017 to June 2018, around 70 patients who were histopathologically proven cases of carcinoma cervix and referred for MRI pelvis to the Department of Radio diagnosis, Coimbatore medical college hospital, Coimbatore were included in the study.

STUDY DESIGN: Hospital based observational study

SETTING:

Department of Radio diagnosis in collaboration with Department of Surgical oncology, Department of Radiation oncology and Department of Obstetrics and Gynaecology.

STUDY METHODOLOGY:

Histopathogically diagnosed cases of carcinoma cervix who were referred to the Department of Radio diagnosis were included. In this study, two groups of patients were included– newly diagnosed and post treatment cases. After obtaining permission from the institutional medical research ethics committee and taking informed consent from the patients, they were subjected to MRI pelvis using a 1.5 – Tesla system.

Different MRI sequences like TRUFI coronal, axial and sagittal T2WTSE, axial and sagittal T1WTSE, STIR axial, DWI – MRI with ADC and contrast enhanced oblique axial, coronal and sagittal FST1 WTSE were used.

The contrast gadolinium DTPA was given at a dose of 0.1 mmol / kg at a rate of 1 ml / second.

MRI SEQUENCES	**NON CONTRAST SCANS**		**FAT SUPPRESSED SCANS**	
	T1 W FSE	**T2 W TSE**	**STIR**	**FS T1 W TSE (CONTRAST)**
IMAGING PLANE	**AXIAL AND SAGITTAL**	**AXIAL AND SAGITTAL**	**AXIAL**	**SAGITTAL AXIAL CORONAL**
TR/ TE (m sec)	633/ 11	6320/ 116	9060/14	500/ 11
FOV	1785*847	1785*847	1785*847	1785*847
SECTION THICKNESS (mm)	4 mm	4 mm	4 mm	5 mm
MATRIX	768*768	512*512	512*360	768*768

THE FOLLOWING WERE ASSESSED:

- Size of tumor
- Tumor enhancement
- Extension into the vagina and lower uterine body
- Parametrial / pelvic side wall involvement

- Urinary bladder / rectal wall invasion
- Presence of hydroureteronephrosis and distant abdominal metastasis.
- Lymph node involvement
- Complications of radiation therapy

FIGO staging was incorporated into the MRI grading of the tumor and the correlation between the clinical and MRI FIGO staging was studied. In post RT patients, tumor recurrence and treatment response were studied.

INCLUSION CRITERIA:

- Carcinoma cervix patients who were referred to our department for MR imaging both newly diagnosed and those who were on post treatment follow up.

EXCLUSION CRITERIA:

- Patients with cardiac pacemakers, new implants, clips within the body and other contraindications of MR imaging like claustrophobia were excluded.

RESULTS:

When MRI was compared with clinical FIGO staging of carcinoma cervix, mass was easily identified by MRI. MRI staging correlated well with clinical staging in II B. Hence, it greatly helps in deciding treatment. MRI can be used as a single best investigation in the staging obviating the need for multiple

invasive procedures. Clinical stage III was frequently up-staged using MR imaging. A combination of T2 and DWI was the optimum technique in both new and recurrent cases. Invasion of parametrium, pelvic side wall and adjacent organs are depicted clearly in MRI. Nodal status was also assessed using these sequences. The accuracy, sensitivity, positive and negative predictive values of MRI in newly diagnosed cases are 88.19%, 88%, 92.59% and 95.65% respectively. The accuracy, sensitivity, specificity, positive and negative predictive values of MRI in recurrent cases are 57.89%, 88.89%, 30%, 53.33% and 75% respectively.

T2 and Diffusion weighted images were the best sequences not only in identifying recurrence but also in excluding false positive in already treated patients. Contrast study provides no additional information was inferred from our study. The most important prognostic indicator was the uterine body involvement in patients with carcinoma cervix. Uterine body involvement could be directly correlated with advanced stage of the disease and it is also associated with nodal metastases. Nodal involvement is another important prognostic factor. Mean size of the tumor was another important prognostic factor as this could be correlated with the stage of the disease and nodal involvement. Post radiation complications were more common to develop after 2-3 years of radiotherapy. The most common post radiotherapy changes were fatty replacement of bone marrow followed by cystitis and proctitis.

Size of mass lesion, uterine body involvement and nodal metastasis were important prognostic factors that could be correlated with the stage of disease and these were assessed better using MRI. Uterine body involvement was an important prognostic factor as it was associated with stage IV disease and nodal metastases. Complications of radio therapy were also better evaluated using MRI.

CONCLUSION:

MRI scores better than routine clinical examination and FIGO staging in diagnosis, staging and identification of recurrence. T2 W imaging in combination with DWI is the most valuable sequence. Contrast imaging provides no additional benefit in both new and treated cases. MRI can be used as the single best investigation for both new and recurrent cases.

KEY WORDS:

Uterine cervical carcinoma, FIGO staging, parametrial infiltration, diffusion weighted imaging.